

CLAIMS

We claim:

1. A battery charger for charging a first battery with a first voltage rating from a charging system for recharging a second battery having a second voltage rating, said charger interposed in a circuit connecting said first battery to said second battery, said battery charger comprising:

a relay switch interposed in said circuit between said first and second batteries, said switch having an open position in which no electrical current flows between said first and second batteries and a closed position in which electrical current flows between the batteries;

a timer mechanism connected to said relay switch, said timer mechanism for causing said relay switch to alternate between said open and closed positions at predefined time periods;

a voltage monitor connected to said first battery, said voltage monitor for detecting the voltage stored in said first battery;

wherein said voltage monitor causes said circuit to remain open when said first battery reaches a predefined minimum voltage.
2. The battery charger of claim 1 and further comprising:

a second relay switch interposed in said circuit between said first and second batteries, said second relay switch connected to said timer and said voltage monitor and having an open position and a closed position;

wherein said second relay switch closes when said first battery is initially connected to said second battery across said circuit and,

wherein said second relay is caused to remain open after the first to occur of either the lapse of a second predefined period of time as indicated by said timer or said first battery reaching a predefined minimum voltage as indicated by said voltage monitor.

3. A battery charger for charging a plurality of first batteries each having a first voltage rating from a charging system for recharging a second battery having a second voltage rating, said charger interposed in a circuit connecting each said first batteries in parallel to said second battery, said charger comprising:
 - a decoupling solenoid interconnected between electrically adjacent said first batteries, said solenoid caused to be open when the first batteries are charging;
 - a first relay switch interposed in said circuit between each said first batteries and said second battery, each said switch having an open position in which no electrical current flows between its said first battery and said second battery and a closed position in which electrical current flows between the last said batteries;
 - a second relay switch interposed in said circuit between said second battery and all said first batteries, said second relay switch having an open position and a closed position;
 - a control processor including a clock and a voltage monitor, said control processor connected to said first relay switches, to said second relay switch, to each said first batteries, to said second battery, and to said decoupling solenoid;wherein said clock in said control processor causes said relay switches to alternately open and close for a predefined period of time in sequence such that no more than one said first batteries is in a closed circuit with said second battery at any time;

and,

wherein said control processor causes said second relay switch switches to switch to said closed position when said first batteries are initially connected to said second battery and to switch to said open position when said first batteries reach either a specified minimum voltage as controlled by said voltage monitor or after a second predetermined period of time as controlled by said timer, whichever occurs first.

4. A method of recharging a plurality of first batteries having a first voltage rating from a charging system for recharging a second battery having a second voltage rating, said method comprising the steps:
 - a. electrically isolating said first batteries from each other;
 - b. comparing the voltage in one of said first batteries to a predefined voltage;
 - c. skipping steps d and e if said voltage in said one of said first batteries is greater than said predefined minimum voltage
 - d. connecting said one of said first batteries to said second battery for a predefined period of time if said voltage in said one of said first batteries is less than a predefined minimum voltage;
 - e. disconnecting said one of said first batteries from said second battery for a second predefined period of time;
 - f. repeating steps b, c, d, e, and f on each of the other of said first batteries in alternating sequence until the voltage in each of said first batteries reaches a predefined minimum voltage.